SIEMENS	INSTALLATION AND SERVICE INSTRUCTION

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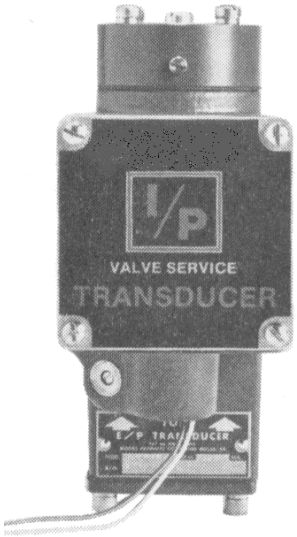
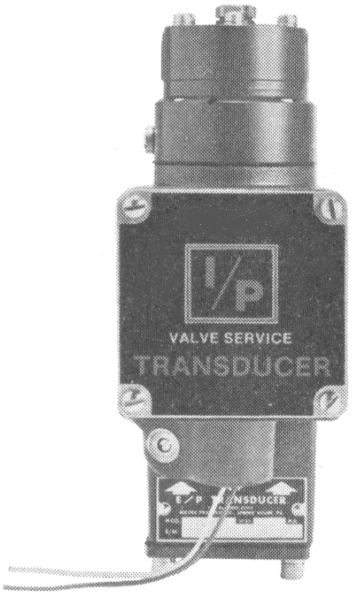


MODEL 771S



MODEL 771B

Model Series 771
I/P Valve Service Transducers

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Changes for Revision 7, February 2006

Significant changes for this revision are indicated by change bars in the outside page margins. Some of these changes are listed below.

SECTION	CHANGE
Cover	Changed publication revision number and date.
1.2 Specifications	Added supply pressure specifications for 3-27 psig output models.
1.3 Product Support	Updated.

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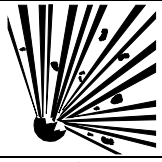
Procedures in this document have been reviewed for compliance with applicable approval agency requirements and are considered sound practice. Neither Siemens Energy & Automation, Inc. nor these agencies are responsible for repairs made by the user

PREFACE

Conventions and Symbols

The following symbols may appear in this manual and may be applied to the equipment. The reader should become familiar with the symbols and their meaning. Symbols are provided to quickly alert the user to safety related situations, issues, and text.

Symbol	Meaning
	Indicates an immediate hazardous situation which, if not avoided, *will* result in death or serious injury.
	Indicates a potentially hazardous situation which, if not avoided, *could* result in death or serious injury.
	Indicates a potentially hazardous situation which, if not avoided, *may* result in minor or moderate injury.
CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in property damage.
NOTICE	Indicates a potential situation which, if not avoided, may result in an undesirable result or state.
Important	Identifies an action that should be taken to avoid an undesirable result or state.
Note	Identifies additional information that should be read.
	Electrical shock hazard. The included Warning text states that the danger of electrical shock is present.
	Electrical shock hazard. Indicated that the danger of electrical shock is present.
	**Explosion hazard.** Indicates that the danger of an explosion hazard exists.
	Electrostatic discharge. The presence of this symbol indicates that electrostatic discharge can damage the electronic assembly.

Conventions and Usage Notes:

- Part numbers are for items ordered from the Process Industries Division of Siemens Energy & Automation, except as noted.

Qualified Persons

The described equipment should be installed, configured, operated, and serviced only by qualified persons thoroughly familiar with this publication. A copy of this publication is shipped with the equipment. The current version, in Portable Document Format (PDF), is available at http://www.sea.siemens.com/ai/.

For the purpose of this publication and product labels, a qualified person is one who is familiar with the installation, construction, and operation of the equipment, and the involved hazardous. In addition, he or she has the following qualifications:

- Is trained and authorized to energize, de-energize, clear, ground and tag circuits and equipment in accordance with established safety practices.
- Is trained in the proper care and use of protective equipment such as rubber gloves, hard hat, safety glasses or face shields, flash clothing, etc., in accordance with established safety practices.
- Is trained in rendering first aid.

Scope

This publication does not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in connection with installation, operation, or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to one of the support groups listed in the Product Support section of this manual.

The contents of this manual shall not become part of or modify any prior or existing agreement, commitment or relationship. The sales contract contains the entire obligation of Siemens. The warranty contained in the contract between the parties is the sole warranty of Siemens. Any statements continued herein do not create new warranties or modify the existing warranty.

General Warnings and Cautions

This equipment contains hazardous voltages, and it has been certified for use in the hazardous locations specified on the product nameplate and in the Model Designation and Specifications section. Death, serious personal injury, or property damage can result if safety instructions are not followed. Only qualified personnel should work on or around this equipment after becoming thoroughly familiar with all warning, safety notices, and maintenance procedures contained herein. The successful and safe operation of this equipment is dependent upon proper handling, installation, operation, and maintenance.

The perfect and safe operation of the equipment is conditional upon proper transport, proper storage, installation and assembly, as well as, on careful operation and commissioning.

The equipment may be used only for the purposes specified in this publication.

Electrostatic discharge can damage or cause the failure of semiconductor devices such as integrated circuits and transistors. The symbol at right may appear on a circuit board or other electronic assembly to indicate that special handling precautions are needed.

- A properly grounded conductive wrist strap must be worn whenever an electronics module or circuit board is handled or touched. A service kit with a wrist strap and static dissipative mat is available from most electronic supply companies.
- Electronic assemblies must be stored in anti-static protective bags when not installed in equipment.

1.0 INTRODUCTION

This instruction describes the installation, operation, and maintenance of Model Series 771 I/P Valve Service Transducers.[1] These transducers are intended to be used for valve service. They provide a pneumatic output that is proportional to a mAdc input. Input and output ranges are stated below in Section 1.1 Model Designation. Two standard models are available: standard capacity output and boosted output; see the Model Designation section.

Transducers with a model number suffix F1 or F2 are Factory Mutual System approved for installation in various National Electrical Code classified hazardous locations. Note that particular attention must be given to the installation and maintenance of transducers whose model numbers have the suffix F1. These models are FM approved to be part of an intrinsically safe system when installed and maintained according to the requirements outlined in this instruction and in the installation instructions provided by the energy limiting barrier manufacturer.

IMPORTANT

Save this Instruction and make it available for installation and maintenance of the transducer.

The transducers meet the requirements of a NEMA4 enclosure. Consideration must be given to exhaust alignment to maintain the enclosure requirements as stated in the Section 2 Installation of this instruction.

1.1 MODEL DESIGNATION

Sample Model Number 771 16 S N F1

I/P Transducer

Input/Output Range (see the table below)

Model No. Entry	Input Range (mAdc)	Output Range (psig)	Input Impedance (Ohms)
3	1-5	3-15	2450
8	4-20	3-27	610
16	4-20	3-15	185
40	10-50	3-15	30

Output Capacity
- B = Boosted
- S = Standard

Options
- N = None
- T = Terminal Strip

Electrical Approval (Factory Mutual
- N = None
- F1 Intrinsically Safe
- F2 Non-Incendive
- Note: For approval details, see Electrical Classification in Section 1.2 Specifications

[1] May be manufactured by either Siemens or Moore Products Co.

1.2 SPECIFICATIONS

Supply Pressure
- 3-15 psig Output Models
  - Normal ..... 20 psig
  - Minimum ..... 18 psig
  - Maximum
    - Standard Capacity Models ..... 30 psig
    - Boosted Models ..... 50 psig
- 3-27 psig Output Models
  - Normal ..... 30 psig
  - Maximum ..... 35 psig
- Effect
  - Standard Capacity Models 20:1
  - Boosted Models 40:1

Output Capacity
- Standard Capacity Models ..... 0.16 SCFM @ 20 psig supply
- Boosted Models ..... 2.0 SCFM @ 20 psig supply

Maximum Air Consumption
- Standard Capacity Models ..... Less than 0.25 SCFM @ 20 psig supply
- Boosted Models ..... 0.2 SCFM @ 20 psig supply

Ambient Temperature Limits ..... -40°C (-40°F) to +80°C (+176°F)

Pneumatic Connections
- Standard Capacity Models ..... 1/4 NPT
- Boosted Models ..... 1/8 NPT

Independent Linearity
- Standard Capacity Models ..... Less than 0.5% of span
- Boosted Models ..... Less than 1% of span

Hysteresis
- Standard Capacity Models ..... Less than 0.1% of span
- Boosted Models ..... Less than 0.25% of span

Repeatability ..... Better than 0.02 psi

Dead Spot ..... Less than 0.05% of span

Response Level ..... <0.025% of span

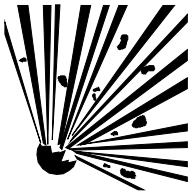
Electrical Classification
- F1 Model Number Suffix ..... Intrinsically safe for Class I, II, III Division 1 Groups A, B, C, D, F, & G when installed in accordance with Siemens drawing 15032-7704 or 15032-7705.
- F2 Model Number Suffix ..... N on-incendive for Class I, Division 2, Groups A, B, C, & D. Dust ignition proof for Class II, Division 1, Groups E, F & G. Suitable for Class III, Division 1 and NEMA 4.

CE Marked ..... EMC Directive 89/336/EC; EN50081-1, EN50081-2, EN61000-6-1, EN61000-6-2

Pressure Equipment Directive ..... Designed and manufactured in accordance with Article 3, Paragraph 3 of Directive 97/23/EC

1.2.1 CSA Hazardous Locations

This section provides CSA hazardous location precautions that should be observed by the user when installing or servicing the equipment described in this manual. These statements supplement those given in the preceding section.



WARNING

Explosion can cause death or serious injury.

Failure to observe the following precautions could result in an explosion hazard.

Installation in hazardous locations must be in accordance with the Canadian Electrical Code, as required by local regulations.

Precautions - English

For Class I, Division 1 and Class I, Division 2 hazardous locations:

- Use only factory-authorized replacement parts. Substitution of components can impair the suitability of this equipment for hazardous locations.

For Division 2 hazardous locations:

When the equipment described in this Instruction in installed without safety barriers, the following precautions should be observed. Switch off electrical power at its source (in non-hazardous location) before connecting or disconnecting power, signal, or other wiring.

Précautions - Français

Emplacements dangereux de classe I, division 1 et classe I, division 2:

- Les pièces de rechange doivent être autorisées par l'usine. Les substitutions peuvent rendre cet appareil impropre à l'utilisation dans les emplacements dangereux.

Emplacement dangereux de division 2:

Lorsque l'appareil décrit dans la notice ci-jointe est installé sans barrières de sécurité, on doit couper l'alimentation électrique a la source (hors de l'emplacement dangereux) avant d'effectuer les opérations suivantes branchment ou débranchement d'un circuit de puissance, de signalisation ou autre.

1.3 PRODUCT SUPPORT

This section provides the Internet site addresses, e-mail addresses, telephone numbers, and related information for customers to access Siemens product support.

When contacting Siemens for support:

- Please have complete product information at hand:
    - For hardware, this information is provided on the product nameplate (part number or model number, serial number, and/or version).
    - For most software, this information is given in the Help > About screen.
- If there is a problem with product operation:
    - Is the problem intermittent or repeatable? What symptoms have been observed?
    - What steps, configuration changes, loop modifications, etc. were performed before the problem occurred?
    - What status messages, error messages, or LED indications are displayed?
    - What troubleshooting steps have been performed?
    - Is the installation environment (e.g. temperature, humidity) within the product's specified operating parameters? For software, does the PC meet or exceed the minimum requirements (e.g. processor, memory, operating system)?
- A copy of the product Service Instruction, User's Manual, or other technical literature should be at hand. The Siemens public Internet site (see the table) has current revisions of technical literature, in Portable Document Format, for downloading.
- To send an instrument to Siemens for repair, request a Return Material Authorization (RMA).

IMPORTANT

An instrument must be thoroughly cleaned (decontaminated) to remove any process materials, hazardous materials, or blood born pathogens prior to return for repair. Read and complete the Siemens RMA form(s).

TABLE 1.1 Contact Information

United States of America	Telephone	+1 800 569 2132, option 2 for Siemens and Moore brand instruments
	Fax	+1 215 283 6358
	E-mail	PITechSupp@sea.siemens.com
	Hours of Operation	8 a.m. to 4:45 p.m. eastern time Monday – Friday (except holidays)
	Public Internet Site	http://www.sea.siemens.com/ia
	Repair Service	+1 215 646 7400 extension 3187

For contact information outside the U.S.A., visit the Siemens public Internet site (see the above table for the URL), locate "Customer Support Process Instrumentation," and click on the Contact Tech Support link to access the Global Support link.

The current revision of this publication and other Siemens technical publications can be found at the Siemens public Internet site. The publications are in Portable Document Format (PDF).

SIEMENS

EC Declaration of Conformity

Manufacturer:	Siemens Energy & Automation, Inc.
Address:	1201 Sumneytown Pike, Spring House, PA 19477
Product:	Model 771 I/P Valve Service Transducer

The product described above, when marked with the CE mark, is in conformity with the provisions of the following European Directives:

89/336/EEC	Council Directive of 3 May 1989 on the approximation of the laws of the member states relating to electromagnetic compatibility. (amended by 91/263/EEC, 92/31/EEC, 93/68/EEC and 93/97/EEC)
97/23/EC	Directive of the European Parliament and the Council of 29 May 1997 on the approximation of the laws of the member states concerning pressure equipment.

Spring House, 3 October 2003

William T. Wright, Manager, PIBU R & D Spring House

John J. Sweeney, Approvals Coordinator

Annex A to the EC Declaration of Conformity

Conformance to the directives indicated on page 1 is assured through the application of the following standards, certifications and assessments.

Directive 89/336/EC Electromagnetic Compatibility

Conformance to directive 89/336/EC is based on conformance with the following standards:

Standard	Date	Description
EN 50081-1	1992	Electromagnetic compatibility - Generic emission standard – Part 1: Residential, commercial and light industry
EN 50081-2	1993	Electromagnetic compatibility - Generic emission standard – Part 2: Industrial environment
EN 61000-6-1	2001	Electromagnetic compatibility (EMC) – Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments
EN 61000-6-2	2001	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards - Immunity for industrial environments

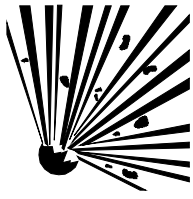
Directive 97/23/EC Pressure Equipment

This product has been designed and manufactured in accordance with Article 3, Paragraph 3 of the Pressure Equipment Directive 97/23/EC.

2.0 INSTALLATION

This section describes transducer installation in hazardous and non-hazardous locations. Each Transducer nameplate shows the hazardous location classifications for which that transducer has been Factory Mutual System approved and/or Canadian Standards Association certified.

All transducer installations should be in accordance with either the current edition of the National Electrical Code (NEC) or the Canadian Electrical Code (CEC), as required by local regulations.



WARNING

Explosion can cause death or serious injury.

Failure to observe the following precautions could result in an explosion hazard.

Installation in hazardous locations must be in accordance with either the NEC or the CEC as required by local regulations.

The F1 (suffix) models must be used in conjunction with energy limiting barriers. See drawing 15032-7704 or 15032-7705 in Section 8. See Section 1.2 Specifications for additional information.

A typical intrinsically safe system consists of one or more F1 (suffix) transducers installed in a hazardous area, the required quantity of appropriate energy limiting barriers installed in a non-hazardous location, and the needed length of interconnecting twisted-pair cables.

2.1 MOUNTING

Figures 2-1 and 2-2 show dimensions, mounting hole locations, electrical access, and pneumatic connections. Mount the transducer in an upright, vertical position. Tilting up to 10° from vertical will not affect its operation

CAUTION

Mounting the transducer where the specified ambient temperature limits may be exceeded can adversely affect performance and may cause damage.

A flat adapter plate is available for mounting the transducer to a blind wall. The adapter plate comes in a kit (PN 12330-100) with two 1/4-20 flat head screws for mounting the plate to the transducer. Either pair of transducer-to-adapter plate mounting holes can be used. See Figure 2-3 for adapter plate dimensions.

A 2" pipe mounting kit (PN 12334-130) is also available. This kit allows the transducer to be mounted on a 2" O.D. pipe. It consists of a mounting bracket to mount the transducer and a U-bolt assembly for pipe mounting.

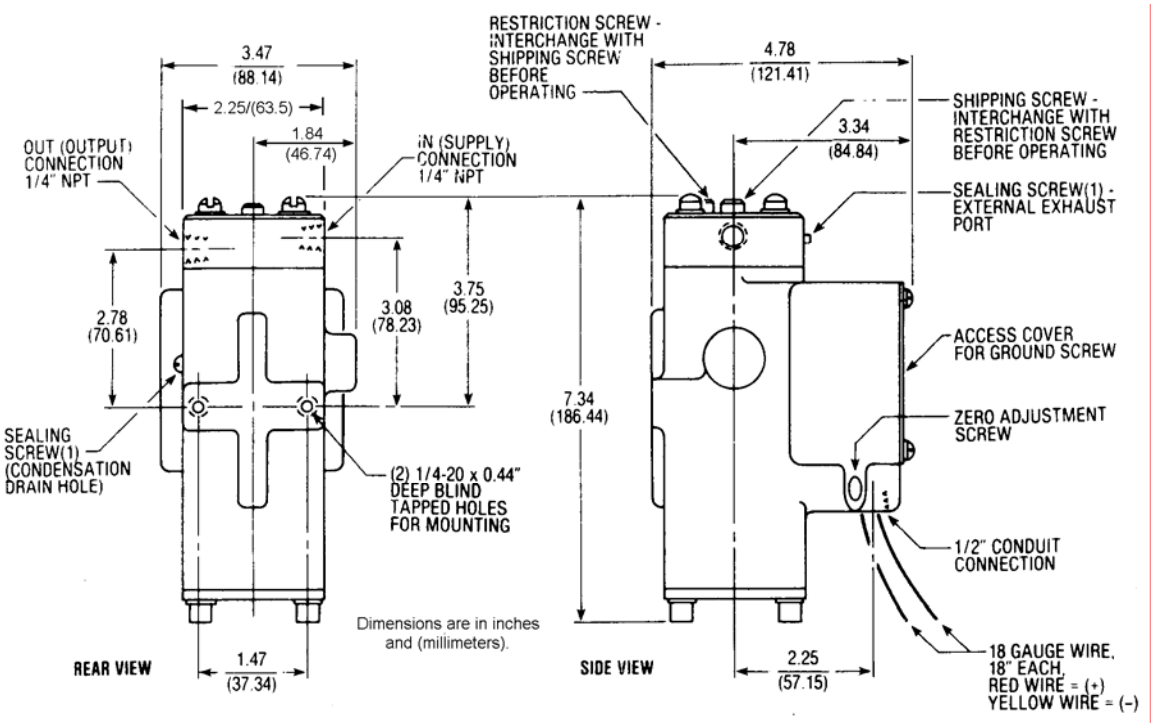

RESTRICTION SCREW - INTERCHANGE WITH SHIPPING SCREW BEFORE OPERATING
3.47 (88.14)
2.25/(63.5)
1.84 (46.74)
OUT (OUTPUT) CONNECTION 1/4" NPT
IN (SUPPLY) CONNECTION 1/4" NPT
2.78 (70.61)
3.08 (78.23)
3.75 (95.25)
SEALING SCREW(1) (CONDENSATION DRAIN HOLE)
(2) 1/4-20 x 0.44" DEEP BLIND TAPPED HOLES FOR MOUNTING
Dimensions are in inches and (millimeters).
REAR VIEW
1.47 (37.34)
4.78 (121.41)
3.34 (84.84)
7.34 (186.44)
SIDE VIEW
2.25 (57.15)
SHIPPING SCREW - INTERCHANGE WITH RESTRICTION SCREW BEFORE OPERATING
SEALING SCREW(1) - EXTERNAL EXHAUST PORT
ACCESS COVER FOR GROUND SCREW
ZERO ADJUSTMENT SCREW
1/2" CONDUIT CONNECTION
18 GAUGE WIRE, 18" EACH, RED WIRE = (+) YELLOW WIRE = (-)

FIGURE 2-1 Installation, Standard Capacity Models

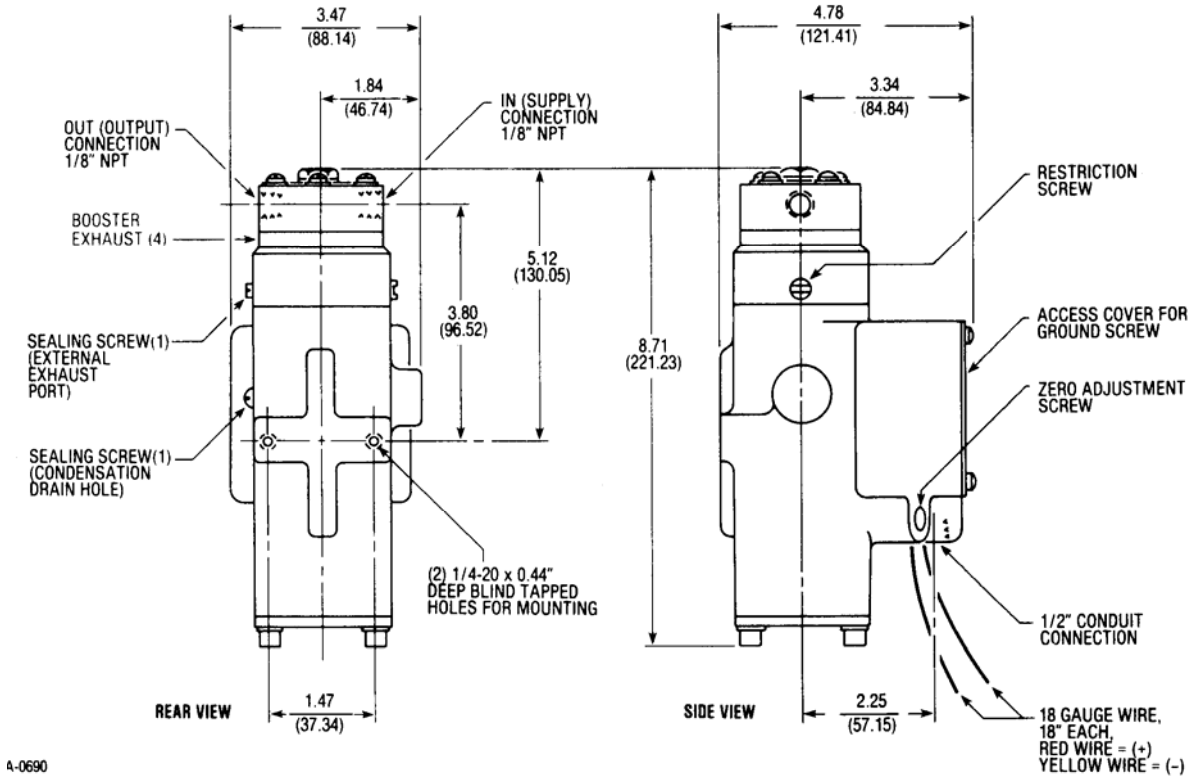


FIGURE 2-2 Installation, Boosted Models

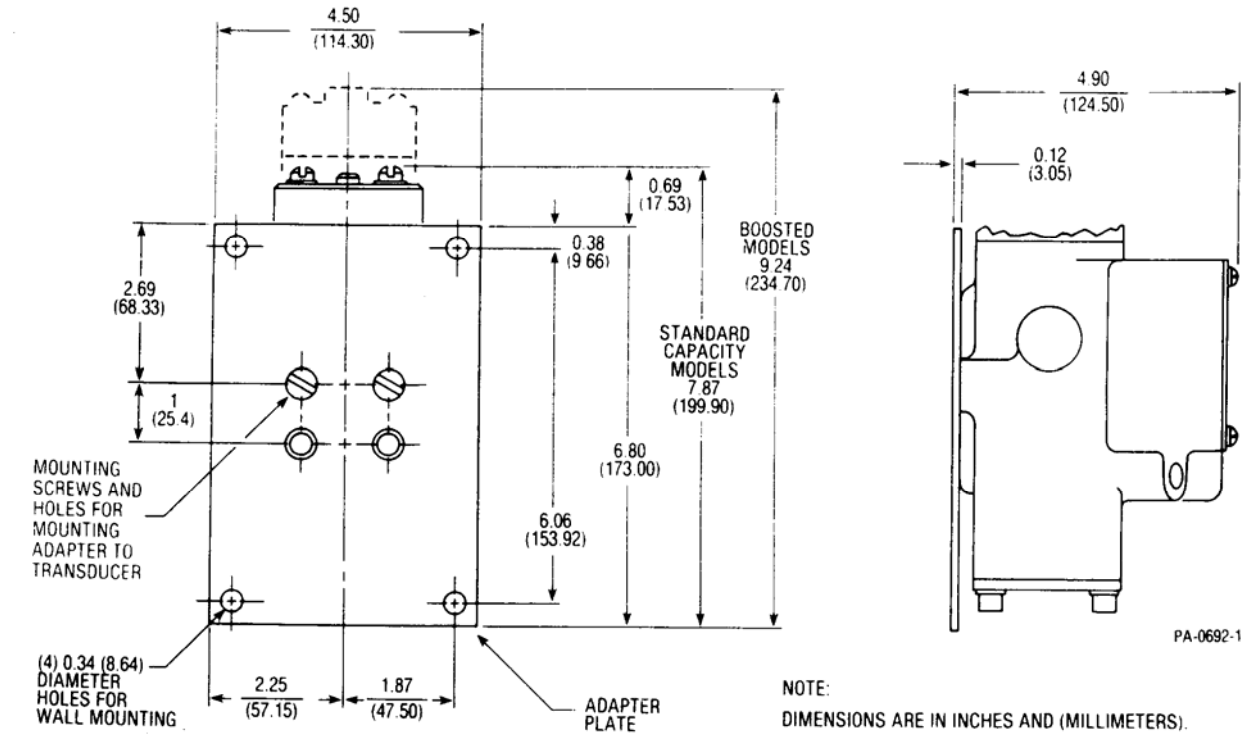


FIGURE 2-3 Optional Mounting Adapter Plate, All Models

2.2 INSTRUMENT AIR REQUIREMENTS

Connect the transducer to a source of clean, dry, oil-free instrument air. Failure to do so will increase the possibility of a malfunction or a deviation from specified performance.

CAUTION

Use of process fluids other than instrument air is not recommended. No claim is made as to the suitability of this product for use with other process fluids, such as hazardous gases, except as listed on the appropriate certificate. Non-approved instruments are suitable for use with instrument air only. Optional features and modifications such as tapped exhaust do not imply suitability for use with hazardous gases except as listed on the approval certificate.

The requirements for a quality air supply are stated in the Instrument Society of America's "Quality Standard for Instrument Air" (ISA-S7.3 or BS5967: Part 2). Basically, this standard calls for the following.

- Particle Size: The maximum particle size in the air stream at the instrument should be no larger than 3 microns.
- Dew Point: The dew point - at line pressure - should be at least 10°C (18° F) below the minimum temperature to which any part of the instrument air system is exposed at any season of the year. Under no circumstances should the dew point - at line pressure - exceed 2°C (35.5°F).
- Oil Content: The maximum total oil or hydrocarbon content, exclusive of noncondensibles, should not exceed 1 ppm under normal operating conditions.

Recommended supply pressure is listed in Section 1.2 Specifications.

CAUTION

Supply pressure in excess of the specified maximum may cause damage.

2.3 PIPING

The supply (IN) and output (OUT) connections on the transducer are shown in Figures 2-1 and 2-2. Quarter-inch O.D. tubing is recommended for piping to the transducer. Before making connections, blow out all piping.

Use pipe sealant sparingly and then only on the male threads of the tube fittings. A non-hardening sealant is strongly recommended. There must be no leaks, especially in the output. Leak-test all fittings and tube connections.

2.4 EXHAUST ALIGNMENT

The transducer has two exhaust ports: one external, at the front of the top housing, and the other internal, behind the access cover; see Figure 2-4. As shipped, two sealing screws are installed: one is installed in the external exhaust port at the front of the top housing, and a second is installed in the condensation drain. This configuration allows the transducer's exhaust air to purge the terminal enclosure, the conduit, and associated electronic enclosure (if used).

CAUTION

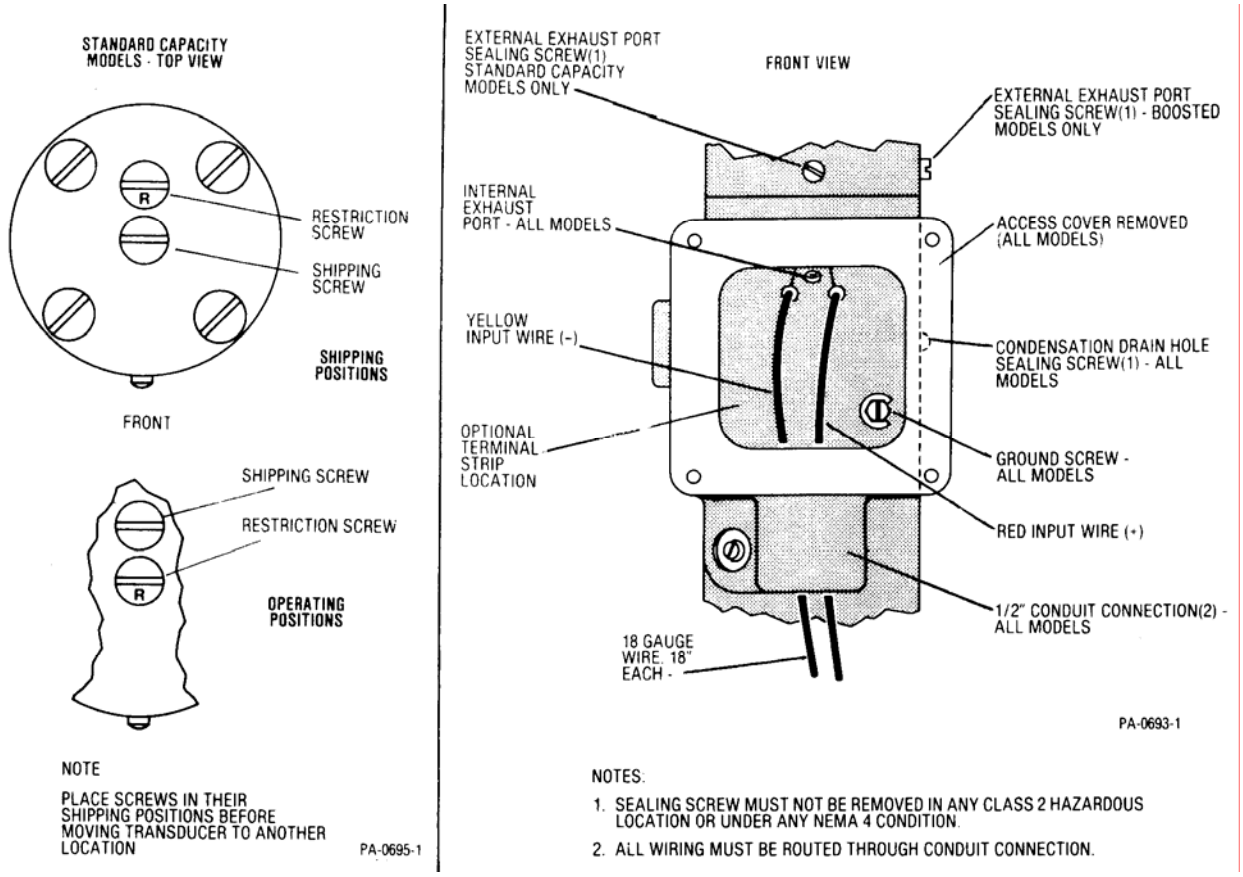
Do not remove either the exhaust sealing screw or the condensation drain sealing screw in a Class II hazardous location or under any NEMA 4 condition.

If airtight conduit, conduit fittings, and electronic enclosures are used, move the exhaust sealing screw to the internal exhaust port in the terminal enclosure (Figure 2-4) and remove the condensation drain sealing screw. This allows the transducer exhaust to vent to atmosphere through the external exhaust port. It also allows any accumulated condensation from the instrument air supply to drain from the coil cavity.

2.5 SHIPPING AND RESTRICTION SCREWS

A standard capacity model has a factory-installed shipping screw in the center of the top housing to protect the transducer's nozzle during shipment. The restriction screw (stamped R) is located just behind the shipping screw. Interchange these two screws before placing the instrument in operation. Turn the restriction screw in tightly for proper operation.

If the transducer is to be moved to another location, return the shipping and restriction screws to their original positions to protect the nozzle. See Figure 2-4 for the positions.


STANDARD CAPACITY MODELS - TOP VIEW
R
RESTRICTION SCREW
SHIPPING SCREW
SHIPPING POSITIONS
FRONT
SHIPPING SCREW
RESTRICTION SCREW
R
OPERATING POSITIONS
NOTE
PLACE SCREWS IN THEIR SHIPPING POSITIONS BEFORE MOVING TRANSDUCER TO ANOTHER LOCATION
PA-0695-1
EXTERNAL EXHAUST PORT SEALING SCREW(1) STANDARD CAPACITY MODELS ONLY
FRONT VIEW
EXTERNAL EXHAUST PORT SEALING SCREW(1) - BOOSTED MODELS ONLY
INTERNAL EXHAUST PORT - ALL MODELS
ACCESS COVER REMOVED (ALL MODELS)
YELLOW INPUT WIRE (-)
CONDENSATION DRAIN HOLE SEALING SCREW(1) - ALL MODELS
OPTIONAL TERMINAL STRIP LOCATION
GROUND SCREW - ALL MODELS
RED INPUT WIRE (+)
1/2" CONDUIT CONNECTION(2) - ALL MODELS
18 GAUGE WIRE, 18" EACH -
PA-0693-1
NOTES:
1. SEALING SCREW MUST NOT BE REMOVED IN ANY CLASS 2 HAZARDOUS LOCATION OR UNDER ANY NEMA 4 CONDITION.
2. ALL WIRING MUST BE ROUTED THROUGH CONDUIT CONNECTION.

Shipping and Restriction Screws **Exhaust Alignment and Electrical Connections**

FIGURE 2-4 Restriction Screw and Exhaust Port Locations and Electrical Connections

2.6 WIRING

A transducer is provided with two 18", 18 AWG (0.96 mm^2) wires that exit the enclosure. Optionally, these wires are terminated at a terminal strip within the enclosure. Figures 2-1, 2-2, and 2-4 locate the access cover and the 1/2" conduit connection. Route all wiring through the conduit connection.

As shipped from the factory, the conduit connection is a vent path for the transducer's exhaust. Refer to the Section 2.4 Exhaust Alignment if airtight conduit or fittings are used.

The recommended wire size is 22 AWG (0.38 mm^2) stranded or solid. Use insulated, crimp-on ring tongue or spring spade tongue terminals for #6 screws. Use of a high quality crimping tool is recommended.

No special considerations are required for wiring a non-intrinsically safe transducer. However, intrinsically safe models must be installed as detailed in the next section.

2.6.1 Intrinsically Safe Models

An F1 (suffix) model is considered intrinsically safe only when it has a nameplate with the FM logo and the words INTRINSICALLY SAFE.

Install the transducer in strict compliance with the instructions furnished by the barrier manufacturer and in accordance with Siemens drawing 15032-7704 (FM and CSA) or 15032-7705 (FM only). See Section 1.2 Specifications for additional information. See Section 8 for the referenced drawings.

1. Install the F1 (suffix) model transducer in the hazardous area as detailed by this section of this instruction.
2. Install the required energy limiting barriers in the non-hazardous area. Refer to the barrier manufacturer's instructions and to the appropriate connection diagram in this instruction.
3. Install the required wiring between the F1 (suffix) model transducer and the barriers. Use shielded or unshielded multi-pair or single-pair cables. Ground the transducer body as required.
4. In a similar manner, install the required wiring between the barriers and the output terminals of the device driving the transducer.
5. Install the redundant ground system for the barrier installation as specified by the barrier manufacturer.
6. Check all signal and ground connections.
7. Check all pneumatic connections and transducer adjustments.
8. Check the calibration of the transducer as outlined in the Section 4 Calibration.

3.0 OPERATION

As shown in Figure 3-1, there are two models: standard capacity output and boosted output. In both models, the input coil and float are attached to a common center shaft to form the “moving coil assembly”. This assembly is free to move vertically. The float is submerged in Silicone fluid and is sized so that the resultant buoyant force equals the weight of the moving coil assembly. This puts the moving coil assembly into a state of neutral buoyancy, which, together with the viscous damping of the Silicone fluid, makes the transducer insensitive to shock and vibration.

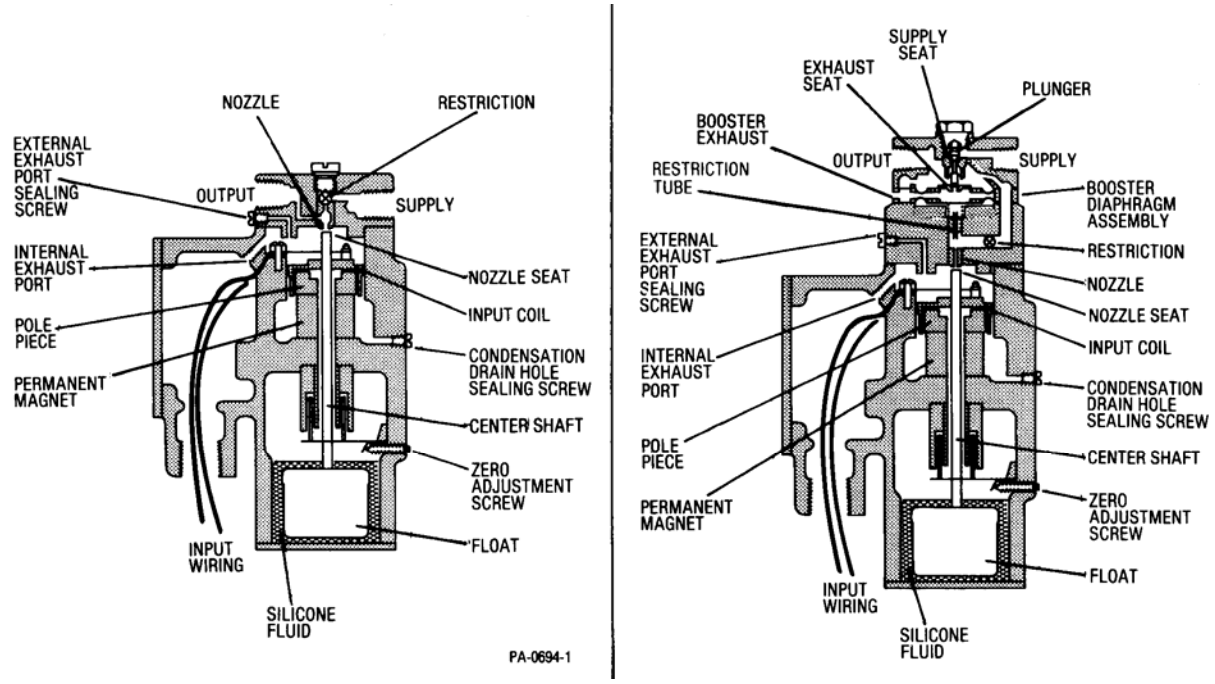
The permanent magnet provides a magnetic field that passes through the input coil. Current flowing through the coil reacts with the magnetic field to force the moving coil assembly closer to the nozzle. The top end of the common center shaft serves as a nozzle seat that restricts the flow of air exhausting from the nozzle.

3.1 STANDARD CAPACITY MODEL

Supply air is routed to the nozzle through a restriction. The restriction and the nozzle form a pressure-divide circuit. The pressure in the nozzle (actually a backpressure) varies according to the restrictive effect imposed by the nozzle seat. The nozzle backpressure is the output of the transducer.

The nozzle forms a column of air that has a diameter equal to the nozzle diameter. This column of air acts on the nozzle seat to oppose and equal the force produced by the coil. The force produced by the coil is continuously balanced by the nozzle backpressure so that the transducer output pressure is, at all times, directly proportional to the coil current.

The Zero adjustment is provided by a screw that varies a spring force on the moving coil assembly.



Standard Capacity Output Model **Boosted Output Model**

FIGURE 3-1 Transducer Schematics

3.2 BOOSTED MODEL

Supply air is applied directly to the supply port of the pilot valve. Transducer output is biased and then fed through the restriction to the nozzle. The nozzle backpressure varies according to the restrictive effect of the nozzle seat. The nozzle forms a column of air that has a diameter equal to the nozzle diameter. This column of air acts on the nozzle seat to oppose and equal the force produced by the coil current.

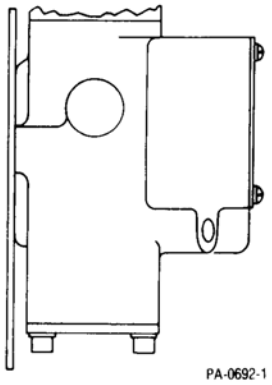
The nozzle backpressure is the input to the boosted diaphragm assembly (lower side), and it is directly proportional to the coil current. An increase in nozzle backpressure operates the diaphragm assembly that moves the pilot valve to open the supply port and increase the booster (transducer) output. A decrease in nozzle backpressure, due to a decrease in coil current, operates the diaphragm assembly to open the exhaust port and decrease the output. The output is directly proportional to the nozzle backpressure and it acts on the upper side of the diaphragm assembly to balance the nozzle backpressure acting on the lower side. Note that the restriction tube serves as a circuit stabilizer.

The Zero adjustment is provided by a screw that varies a spring force on the moving coil assembly.

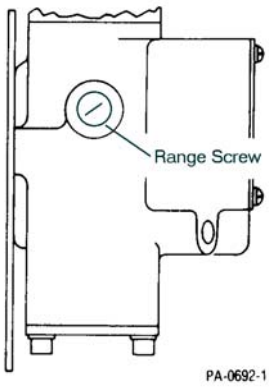
4.0 CALIBRATION

This section describes calibration of the standard capacity and boosted models.

The transducer housing for some units may be different from that shown elsewhere in this instruction. A range screw may be present; see Figure 4-1. All performance specifications remain as stated. *It is not necessary to adjust the range screw during calibration.*



Standard Housing



Housing with Range Screw

FIGURE 4-1 Housings

4.1 TEST EQUIPMENT

Gather the following equipment to calibrate the transducer. For any instrument, the test equipment used for calibration should be at least twice as accurate as the specified accuracy of the instrument being calibrated.

1. 0-50 mAdc source
2. Digital Multimeter: Accuracy to 0.1% of reading
3. Test Gauge: Range, 0-15 psig (0-30 psig for 3 to 27 psig output); 0.02 psi per division; accurate to 0.6% of full scale
4. Supply Air Source: 20 psig

4.2 PROCEDURE

1. Position the Transducer so that it is upright and within 10 degrees of vertical. If the transducer has been lying on its side, allow approximately 15 minutes before attempting a final calibration. This allows the transducer's viscous damping fluid to collect at the bottom of the transducer.
2. Refer to Figures 2-1, 2-2, and 2-4 and connect the test equipment to the transducer.
   1) Connect the test gauge to the Output port.
   2) Connect the supply air source to the Supply connection.
   3) Connect the current source and digital multimeter to the two signal input wires or optional terminal block. Observe polarity.
3. Standard capacity model only – Refer to Section 2.5 and install the restriction screw (stamped R) in its operating position. An instruction label on the transducer also explains the steps involved.
4. Set the milliamp source to the starting point value for the input signal range (e.g. 4 mA for a 4 to 20 mA range). Adjust the transducer's ZERO for a 3 psig output. The ZERO adjustment screw changes the operating level. Turn the screw clockwise to raise the output pressure.
5. Exercise the milliamp source from the transducer’s minimum input to maximum input and then to minimum input (e.g. 4 mA to 20 mA to 4 mA). Transducer output should be 3 psig. If not, repeat step 4 and retest.

5.0 MAINTENANCE

This section provides detailed procedures for cleaning standard capacity and boosted models. Troubleshooting a transducer is described and procedures are provided for coil assembly and float replacement. All maintenance procedures require a transducer to be removed from service.

WARNING

Improper service and/or substitution of components may impair the electrical safety of the instrument.

5.1 PREVENTIVE

Most problems associated with pneumatic instruments can be avoided by the use of clean, dry, oil-free instrument air. Refer to Section 2.2 Instrument Air Requirements in this manual and to the Instrument Society of America's publication "Quality Standard for Instrument Air" (ISA-S7.3).

5.2 CLEANING STANDARD CAPACITY MODELS

The filter screens, restriction screw, nozzle and nozzle seat can be cleaned without dismounting the transducer. All are located in the top housing; refer to the parts list at the end of this instruction for disassembly and assembly. Refer to the Parts List as needed for part identification.

5.2.1 Filter Screens

There is a filter screen in the supply (IN) port and in the output (OUT) port.

1. Remove the transducer from service. Remove supply air from the transducer.
2. Remove four screws and lockwashers from the top housing. Remove the housing by pulling straight up.
3. Blow the two screens down in a reverse direction.
    1) Remove the restriction screw (turn counterclockwise with a screwdriver).
    2) Cover the nozzle opening with a finger. Blow compressed air into the port from which the restriction screw was removed. If the dirt remains, loosen it mechanically or chemically and repeat the blow down procedure.

    Screen Replacement - If a screen is damaged or cannot be cleaned, it must be replaced.
4. To clean the restriction screw and the nozzle and nozzle seat, go to Section 5.2.2 below. Otherwise, continue to step 5.
5. Install the restriction screw in the top housing.
6. Install the top housing and secure with the four screws and lockwashers removed earlier.

5.2.2 Restriction Screw, Nozzle, and Nozzle Seat

1. The restriction is accessible from the tip of the screw. Clean the restriction with a solvent. If the solvent does not clean the restriction, run a 0.021-inch drill blank through the restriction, from the tip of screw.
2. Inspect the O-ring on the restriction screw. Replace the O-ring if damaged.
3. Install the restriction screw in the top housing.
4. Go to Section 5.2.3.
5. The nozzle is part of the top housing. The nozzle seat is in the transducer housing; the seat is the top end of the center shaft. See Figure 3-1. Clean the nozzle and nozzle seat by wiping with a dry cloth or a solvent dampened

cloth. Do not use abrasive cleaning agents. The important parts of the nozzle to clean are its inner diameter surfaces and the sharp edge of its face.

6. Install the top housing and secure with the four screws and lockwashers removed above.

5.3 CLEANING BOOSTED MODELS

The items that may require cleaning on a periodic basis are shown in the following table. Refer to the Parts List as needed for part identification.

Pilot Base	Exhaust Ring	Nozzle Housing
Supply air filter screen	Pilot air filter screen	Restriction screw
Valve plunger		Nozzle
Supply seat		Nozzle seat
Exhaust seat		Restriction tube

5.3.1 Pilot Base

1. Remove the Transducer from service. Remove supply air.
2. Remove the retaining nut in the pilot base with a 9/16" wrench.
3. Remove the valve plunger and supply air filter screen. These should fall out along with the plunger spring.
4. Clean the valve plunger with a solvent.
5. Blow compressed air through the supply air filter screen. If this does not dislodge the dirt, loosen it mechanically or with a solvent and blow down again.

   Screen Replacement - If a screen is damaged or cannot be cleaned, it must be replaced.
6. Clean the supply seat (in the pilot base) with a solvent or with a tobacco pipe cleaner.
7. Clean the exhaust seat (in the booster diaphragm assembly) with a tobacco pipe cleaner.

5.3.2 Exhaust Ring

Pilot air filter screen cleaning requires that the pilot base and exhaust ring be removed from the transducer

1. Remove the pilot base and exhaust ring.
2. Separate the exhaust ring from the pilot base.
3. Blow compressed air through the screen in the reverse direction. If this does not dislodge the dirt, loosen it mechanically or with a solvent and blow down again.

   Screen Replacement - If a screen is damaged or cannot be cleaned, it must be replaced. Each screen is retained by a fiber washer. Be sure that replacement fiber washers are on-hand before removing a screen.

5.3.3 Nozzle Housing

The restriction screw can be cleaned without removal of the pilot base, exhaust ring, or nozzle housing. These three items, however, must be removed to clean the nozzle, nozzle seat, and restriction tube.

1. Remove the restriction screw from the nozzle housing.
2. Clean the restriction screw with a solvent. It may be necessary to soak the screw in solvent for several minutes. If solvent does not clean the restriction, run a 0.028" drill blank through the restriction, from the tip of the screw.
3. Inspect the O-ring on the restriction screw. Replace the O-ring if it is damaged.

4. Remove the pilot base and exhaust ring (six screws and lockwashers).
5. Remove the nozzle housing (four socket head screws and lockwashers).
6. Clean the nozzle housing in solvent. Blow compressed air through the nozzle and restriction tube.
7. Clean the nozzle seat (end of center shaft) with solvent.
8. Install the nozzle housing.
9. Install the exhaust ring and pilot base.

5.4 TROUBLSHOOTING

Refer to Table 5-1 when troubleshooting the Transducer. It is assumed that a calibrated input signal source is connected to the Transducer.

TABLE 5-1 Trouble Analysis

Symptom	Possible Cause	Remedy
No output	No supply air	Set supply air to 20 psig
	Input leads reversed	Make proper connection. See Section 2.6 Wiring.
	Loss of silicon fluid (Will not occur unless bottom cover has been loosened or removed.)	Replace fluid. See Section 5.6, Float Replacement section.
	Clogged filter screen	Clean screen(s). See Section 5.2 Cleaning Standard Capacity Models or 5.3 Cleaning Boosted Models.
Output oscillates – standard capacity models	Insufficient volume in output tubing	Add volume to output equaling 2-3 feet of standard 1/4” OD tubing
Erratic output during an input change	Misaligned coil	Align the coil. See Section 5.5 Coil Assembly Replacement.
	Foreign object interfering with coil movement	Clean out coil chamber. See Section 5.2 Cleaning Standard Capacity Models or 5.3 Cleaning Boosted Models.
Output above full scale and will not reduce	Shipping screw not in its operating position	Place shipping screw in operating position
	Blocked exhaust port	Clear exhaust port
Output will not increase to full scale	Inadequate supply air	Set supply air to 20 psig.
	Leak in output line or fittings	Repair leak.
	Clogged filter screen	Clean screen(s). See Section 5.2 Cleaning Standard Capacity Models or 5.3 Cleaning Boosted Models.
	Zero out of adjustment	Calibrate transducer. See Section 4 Calibration.
	Misaligned coil	Align the coil. See Section 5.5 Coil Assembly Replacement.
	Foreign object interfering with coil movement	Clean out coil chamber. See Section 5.2 Cleaning Standard Capacity Models or 5.3 Cleaning Boosted Models.
	Loss of silicon fluid (Fluid loss will not occur unless bottom cover has been loosened or removed.)	Replace fluid. See Section 5.6, Float Replacement section.

Table continues on next page

Symptom	Possible Cause	Remedy
Output will not decrease to start of scale	Zero out of adjustment	Calibrate transducer. See Section 4 Calibration.
	Misaligned coil	Align the coil. See Section 5.5 Coil Assembly Replacement.
	Foreign object interfering with coil movement	Clean out coil chamber. See Section 5.2 Cleaning Standard Capacity Models or 5.3 Cleaning Boosted Models.
Heavy exhaust, output will not increase to full scale – boosted models	Valve plunger exhaust seat held open by thread shaving, chip, scale, etc.	Clean valve plunger and seats. See 5.3 Cleaning Boosted Models.

5.5 COIL ASSEMBLY REPLACEMENT

Removal

When disassembling the transducer, take care to prevent metal chips, dirt, and other contaminants from entering the coil chamber. Foreign objects can interfere with coil movement and can change the magnetic field.

Refer to the Parts List section at the rear of this Instruction and the following procedure.

1. For access:
    - Standard capacity model - Remove the top housing (four screws and lockwashers).
    - Boosted model – Remove the pilot base, exhaust ring, and nozzle housing (six screws and lockwashers).
2. Remove the brass clamping plate (one screw).
3. Remove the two Teflon washers.
4. Slide the bowed “E” retaining ring off the shaft.

IMPORTANT

To prevent bending of the center shaft, support it while removing the retaining ring.

5. Remove the coil assembly by carefully lifting it off the center shaft.

Installation

Refer to the Parts List section at the rear of this Instruction and the procedure that follows.

IMPORTANT

The coil assembly and coil chamber must be free of metal chips, dirt and corrosion before installing the coil.

1. Lower the coil assembly onto the center shaft and, at the same time, guide the leaf springs onto the contact posts
2. Install the bowed “E” retaining ring on the center shaft - bowed center up.
3. Install the Teflon washers (small diameter up), clamping plate, and clamping plate screw. Do not tighten the screw at this time; it must be loose until the coil is aligned. Refer to the Alignment procedure below.

Alignment

Refer to Figure 5-1 and use the following procedure.

1. Make three cardboard or paper shims 0.13" thick x 1-1/2" long x 3/8" wide (3.3 mm x 38 mm x 9.5 mm). These can be made from a matchbook cover.
2. Center the coil so that it does not rub against the transducer housing or the pole piece under the coil. Also, position it so the leaf springs do not buckle or snap.
3. If not already done, loosen the spring clamping plate screw.
4. Insert the shims between the coil and the housing at the points shown in Figure 5-1. Insert the shims until their ends are flush with the top surface of the housing. Then, raise the coil to a higher point on the shims by pulling the center shaft up.
5. Rotate the coil on the center shaft so that the leaf springs are perpendicular to the clamping plate and equidistant from the center shaft.
6. Tighten the clamping plate screw and remove the shims.
7. Move the coil up and down on the center shaft. Treat the center shaft as though it were a feeler gauge being used to check a point gap. The coil must not rub against the housing or the pole piece, and the leaf springs must not buckle or snap.
    - If rubbing is detected, repeat the above steps.
    - If a leaf spring snaps to a different curvature, the coil is rotated a little too far to the left or right. Repeat the above steps.

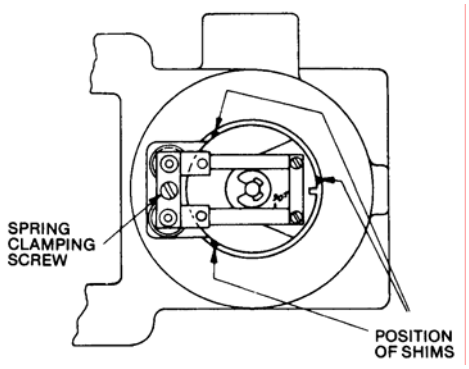


FIGURE 5-1 Coil Alignment

5.6 FLOAT REPLACEMENT

Removal

Refer to the parts list at the rear of this Instruction and the following procedure.

1. Invert the transducer and remove the bottom plate. Keep the transducer inverted to prevent spilling of the Silicon fluid. If fluid spills, it must be replaced. Refer to Damping Fluid below.
2. Gently push the float downward and remove its retaining cotter. Lift out the float.
3. Lift the float positioning spring off the center shaft.

Installation

Installation is the reverse of removal. A new bottom plate gasket is recommended, and the bottom plate must be tightened securely.

IMPORTANT

All traces of Silicon fluid must be wiped from the bottom plate, both sides of the gasket, and the bottom surface of the housing. Otherwise, the fluid will seep past the gasket regardless of how much the screws are tightened.

Check the amount of fluid in the bottom chamber before installing the gasket and plate. See Damping Fluid below.

Damping Fluid

The bottom chamber contains 43cc. of Dow-Corning DC-200 Silicone fluid, 200 centistokes viscosity. Small bottles of this fluid (enough for a little more than one complete fill) may be ordered: PN 12334-43.

Check the fluid depth by inverting the transducer, removing the bottom plate, and inserting a 6" (or equivalent metric) pocket scale between the float and the housing. Allow the scale to bottom in the housing. Fluid depth should be approximately 3/4" (19 mm).

IMPORTANT

All traces of Silicon fluid must be wiped from the bottom plate, both sides of the gasket, and the bottom surface of the housing. Otherwise, the fluid will seep past the gasket regardless of how much the screws are tightened.

6.0 WARRANTY

(a) Seller warrants that on the date of shipment the goods are of the kind and quality described herein and are free of non-conformities in workmanship and material. This warranty does not apply to goods delivered by Seller but manufactured by others.

(b) Buyer's exclusive remedy for a nonconformity in any item of the goods shall be the repair or the replacement (at Seller's option) of the item and any affected part of the goods. Seller’s obligation to repair or replace shall be in effect for a period of one (1) year from initial operation of the goods but not more than eighteen (18) months from Seller’s shipment of the goods, provided Buyer has sent written notice within that period of time to Seller that the goods do not conform to the above warranty. Repaired and replacement parts shall be warranted for the remainder of the original period of notification set forth above, but in no event less than 12 months from repair or replacement. At its expense, Buyer shall remove and ship to Seller any such nonconforming items and shall reinstall the repaired or replaced parts. Buyer shall grant Seller access to the goods at all reasonable times in order for Seller to determine any nonconformity in the goods. Seller shall have the right of disposal of items replaced by it. If Seller is unable or unwilling to repair or replace, or if repair or replacement does not remedy the nonconformity, Seller and Buyer shall negotiate an equitable adjustment in the contract price, which may include a full refund of the contract price for the nonconforming goods.

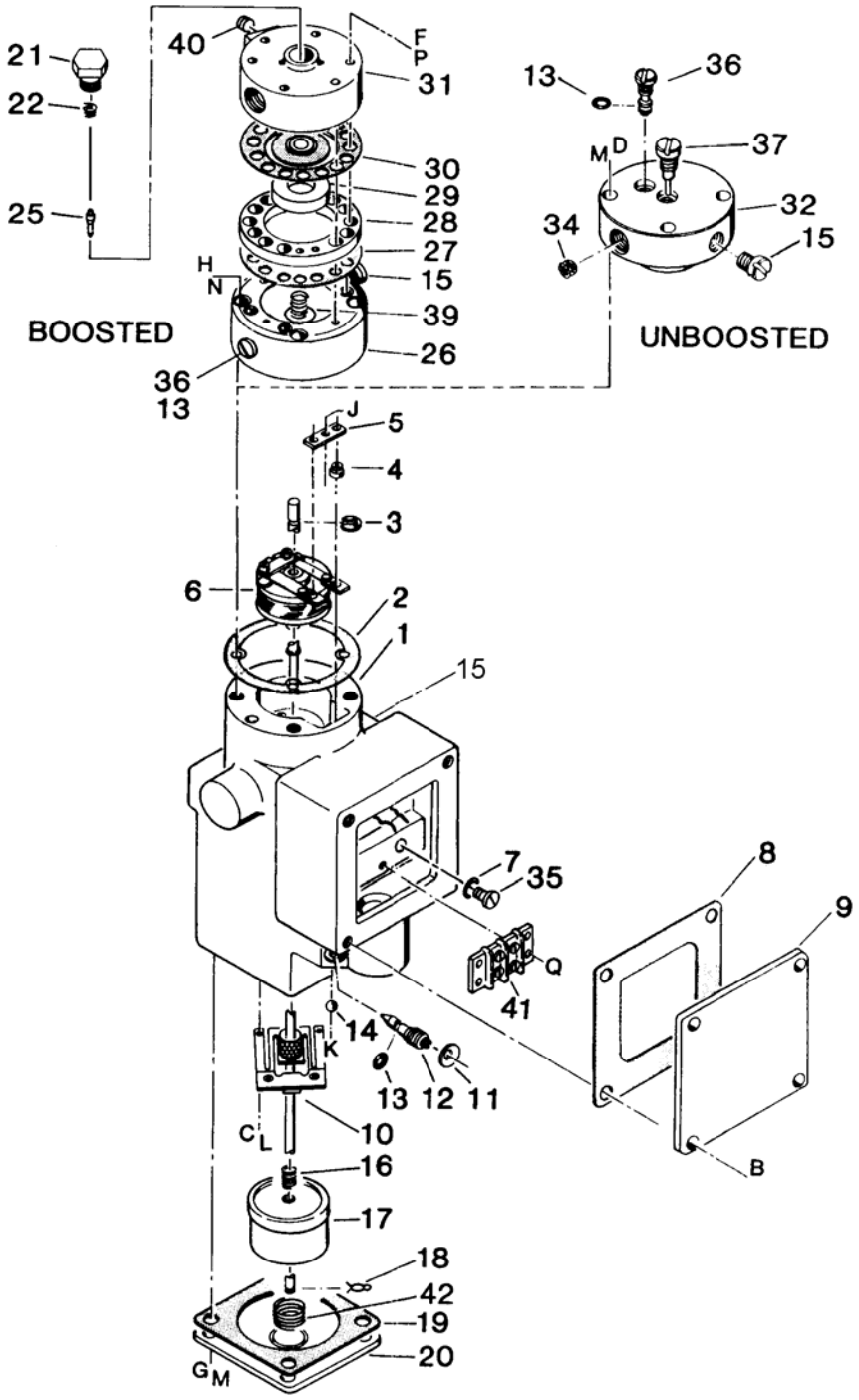
(c) SELLER HEREBY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, EXCEPT THAT OF TITLE. SPECIFICALLY, IT DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, COURSE OF DEALING AND USAGE OF TRADE.

(d) Buyer and successors of Buyer are limited to the remedies specified in this article and shall have no others for a nonconformity in the goods. Buyer agrees that these remedies provide Buyer and its successors with a minimum adequate remedy and are their exclusive remedies, whether Buyer's or its successors’ remedies are based on contract, warranty, tort (including negligence), strict liability, indemnity, or any other legal theory, and whether arising out of warranties, representations, instructions, installations, or non-conformities from any cause.

(e) Note: The above does not apply to any software which may be furnished by Seller. In such cases, the attached Software License Addendum applies.

7.0 PARTS LIST

Model Series 771 I/P Valve Service Transducers



Drawing No. 15791PL
9/03 Supersedes 2/92

IMPORTANT

Service Parts Kits are available for servicing the instrument. Contact Siemens for available kits; refer to the Product Support section of this instruction. Some parts in this Parts List may not be available for separate purchase.

Symbol	Part No.	Description	Boosted, Req'd	Unboosted, Req'd
1	-----	Transducer Housing	1	1
*2	12392-52	Gasket	1	1
*3	12334-62	Bowed E-Ring	1	1
*4	10660-225	Washer	2	2
*5	10660-211	Clamping Plate	1	1
*6	-----	Coil Assembly, See Table	1	1
7	12334-138	Terminal Washer	1	1
*8	12392-54	Cover Gasket	1	1
9	5-1026	Cover Nameplate	1	1
10	12334-61	Center Rod	1	1
11	10660-191	Retaining Screw	1	1
12	12334-59	Zero Screw	1	1
*13	2938-5	O-Ring	2	2
*14	12349-1	Nylon Ball	1	1
*15	2900-23	Sealing Screw	2	2
16	2419-21	Spring	1	1
17	12334-30	Float	1	1
*18	12352-1	Cotter	1	1
*19	12392-53	Gasket	1	1
20a	10660-500	Bottom Cover	1	1
20b	10660-501	Bottom Cover, Reverse Acting Only	1	1
*21	6750-138	Retaining Nut	1	-
22	6750-49	Spring	1	-
*25	6750-21	Pilot Plunger	1	-
26	12334-410	Nozzle Housing	1	-
*27	12334-187	Diaphragm	1	-
28	12334-403	Exhaust Ring	1	-
29	6750-14	Spacer	1	-
*30	6750-18	Diaphragm Assembly	1	-
31	12334-409	Pilot Base	1	-
32	12334-405	Top Housing Assy. (Incl. Item 34)	-	1
*34	2155-225	Filter Screen	-	2
35	1-2364	10-32 x 3/8 Lg. Ground Screw	1	1
*36a	12334-182	Restriction Screw	1	-
*36b	10660-44	Restriction Screw	-	1
37	12334-355	Shipping Screw	-	1
*38	12334-43	Dow Corning 200 Fluid (not shown)	1	1
39	12334-188	Bias Spring	1	-
40	3240	Pipe Plug	1	-
41	7418-580	Terminal Block (T Models Only)	1	1
42	12624-4	Spring (Reverse Acting)	1	1

Symbol	Part No.	Description	Boosted, Req'd	Unboosted, Req'd
*43	15822-172	Filter Screen (Not shown)	2	-
B	1-2373	10-32 x 3/8 Lg. Rd. Hd. Screw	4	4
C	1-0137	2-56 x 1/8 Lg. Fill. Hd. Screw	2	2
D	1-3465	1/4-20 x 1-1/4 Lg. Fill. Hd. Screw	-	4
F	1-2145	8-32 x 1-3/4 Fill. Hd. Screw	6	-
G	1-3251	1/4-20 x 1/2 Lg. Soc. Hd. Screw	4	4
H	1-3430	1/4-20 x 1 Lg Loc. Hd. Screw	4	-
J	3175-188	4-40 x 7/16 Lg. Bind. Hd. Screw	1	1
K	1-5649	8-32 x 3/16 Lg. Soc. Hd Screw	1	1
L	1-7216	#2 Lockwasher	2	2
M	1-7303	1/4 Lockwasher	4	8
N	1-7297	1/4 Lockwasher Hi. Col.	4	-
P	1-7440	#8 Lockwasher	6	-
Q	1-1018	5-40 x 1/2 Rd. Hd. (T Models Only)	2	2

*Recommended On-Hand Spare Parts. Always specify range, serial number or other nameplate information when ordering spare parts.

TABLE Coil Assembly Part Numbers

Symbol	Part No.	Range Input/Output			
		1-5 mA 3-15 psig	**4-20 mA 3-27 psig**	**4-20 mA 3-15 psig**	**10-50 mA 3-15 psig**
6	Intrinsically Safe Model (F1)	12334-78	12334-112	12334-103	12451-6
	Non-Incendive Model (F2)	12334-20	12725-7	12392-2	12451-2

8.0 HAZARDOUS LOCATION INSTALLATION DRAWINGS

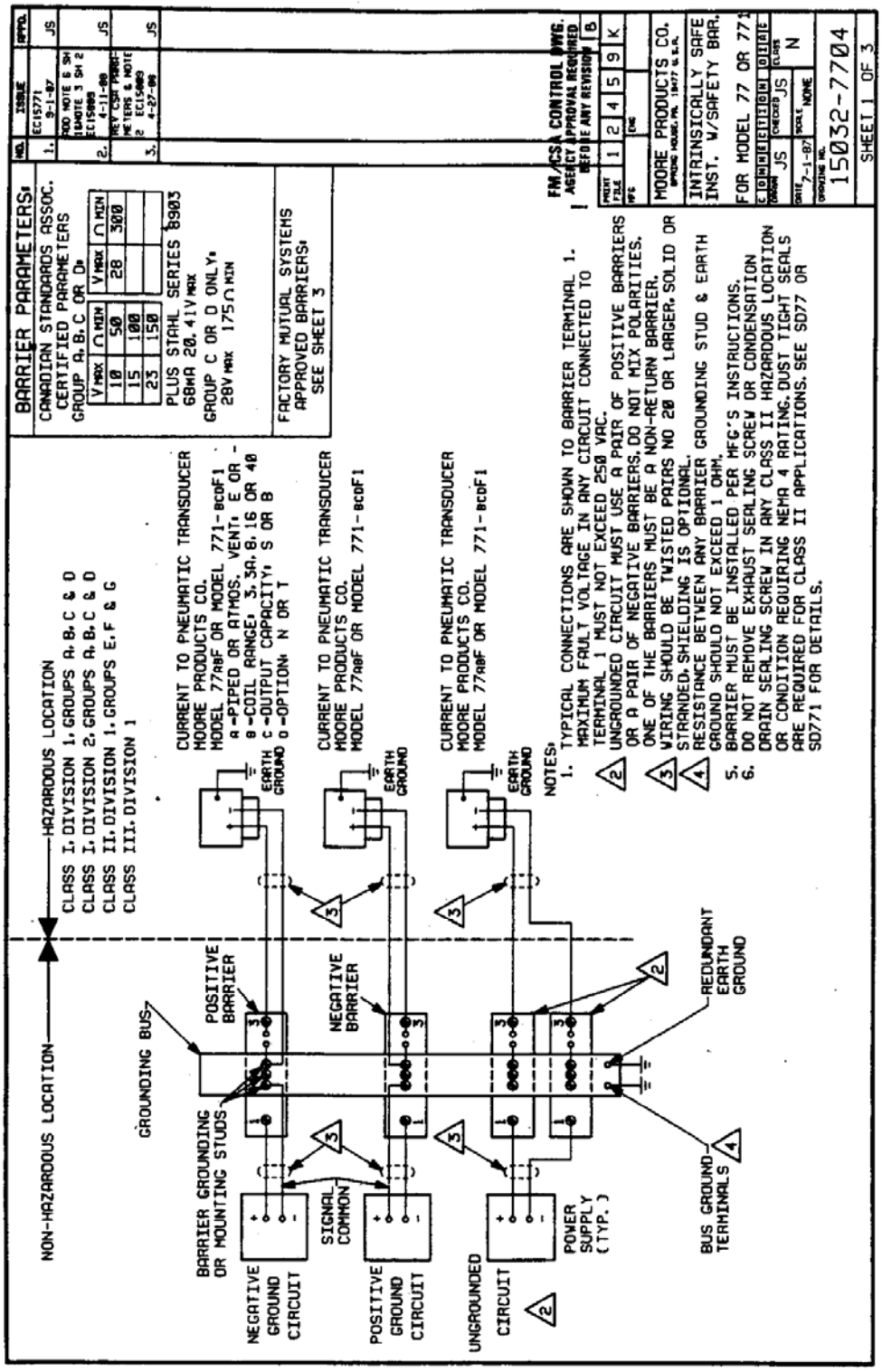

BARRIER PARAMETERS:
CANADIAN STANDARDS ASSOC. CERTIFIED PARAMETERS
GROUP A, B, C OR D:
PLUS STAHL SERIES 8903
68mA 20.41V MAX
GROUP C OR D ONLY:
28V MAX 175Ω MIN
FACTORY MUTUAL SYSTEMS APPROVED BARRIERS: SEE SHEET 3
FM/CSA CONTROL DWG. AGENCY APPROVAL REQUIRED BEFORE ANY REVISION
MOORE PRODUCTS CO.
INTRINSICALLY SAFE INST. W/SAFETY BAR.
FOR MODEL 77 OR 771
15032-7704
SHEET 1 OF 3
HAZARDOUS LOCATION
CLASS I, DIVISION 1, GROUPS A, B, C & D
CLASS I, DIVISION 2, GROUPS A, B, C & D
CLASS II, DIVISION 1, GROUPS E, F & G
CLASS III, DIVISION 1
NON-HAZARDOUS LOCATION
CURRENT TO PNEUMATIC TRANSDUCER MOORE PRODUCTS CO. MODEL 77aaF OR MODEL 771-acdF1
a-PIPED OR ATMOS. VENT: E OR -
8-COIL RANGE: 3, 3A, 8, 16 OR 40
c-OUTPUT CAPACITY: S OR B
d-OPTION: N OR T
EARTH GROUND
GROUNDING BUS
POSITIVE BARRIER
NEGATIVE BARRIER
REDUNDANT EARTH GROUND
BARRIER GROUNDING OR MOUNTING STUDS
SIGNAL COMMON
BUS GROUND TERMINALS
NEGATIVE GROUND CIRCUIT
POSITIVE GROUND CIRCUIT
UNGROUNDED CIRCUIT
POWER SUPPLY (TYP.)
NOTES:
1. TYPICAL CONNECTIONS ARE SHOWN TO BARRIER TERMINAL 1. MAXIMUM FAULT VOLTAGE IN ANY CIRCUIT CONNECTED TO TERMINAL 1 MUST NOT EXCEED 250 VAC.
2. UNGROUNDED CIRCUIT MUST USE A PAIR OF POSITIVE BARRIERS OR A PAIR OF NEGATIVE BARRIERS. DO NOT MIX POLARITIES.
3. ONE OF THE BARRIERS MUST BE A NON-RETURN BARRIER. WIRING SHOULD BE TWISTED PAIRS NO 20 OR LARGER, SOLID OR STRANDED. SHIELDING IS OPTIONAL.
4. RESISTANCE BETWEEN ANY BARRIER GROUNDING STUD & EARTH GROUND SHOULD NOT EXCEED 1 OHM.
5. BARRIER MUST BE INSTALLED PER MFG'S INSTRUCTIONS.
6. DO NOT REMOVE EXHAUST SEALING SCREW OR CONDENSATION DRAIN SEALING SCREW IN ANY CLASS II HAZARDOUS LOCATION OR CONDITION REQUIRING NEMA 4 RATING. DUST TIGHT SEALS ARE REQUIRED FOR CLASS II APPLICATIONS. SEE SD77 OR SD771 FOR DETAILS.

FIGURE 8-1 Intrinsically Safe Installation with Safety Barriers, Model 77 or 771

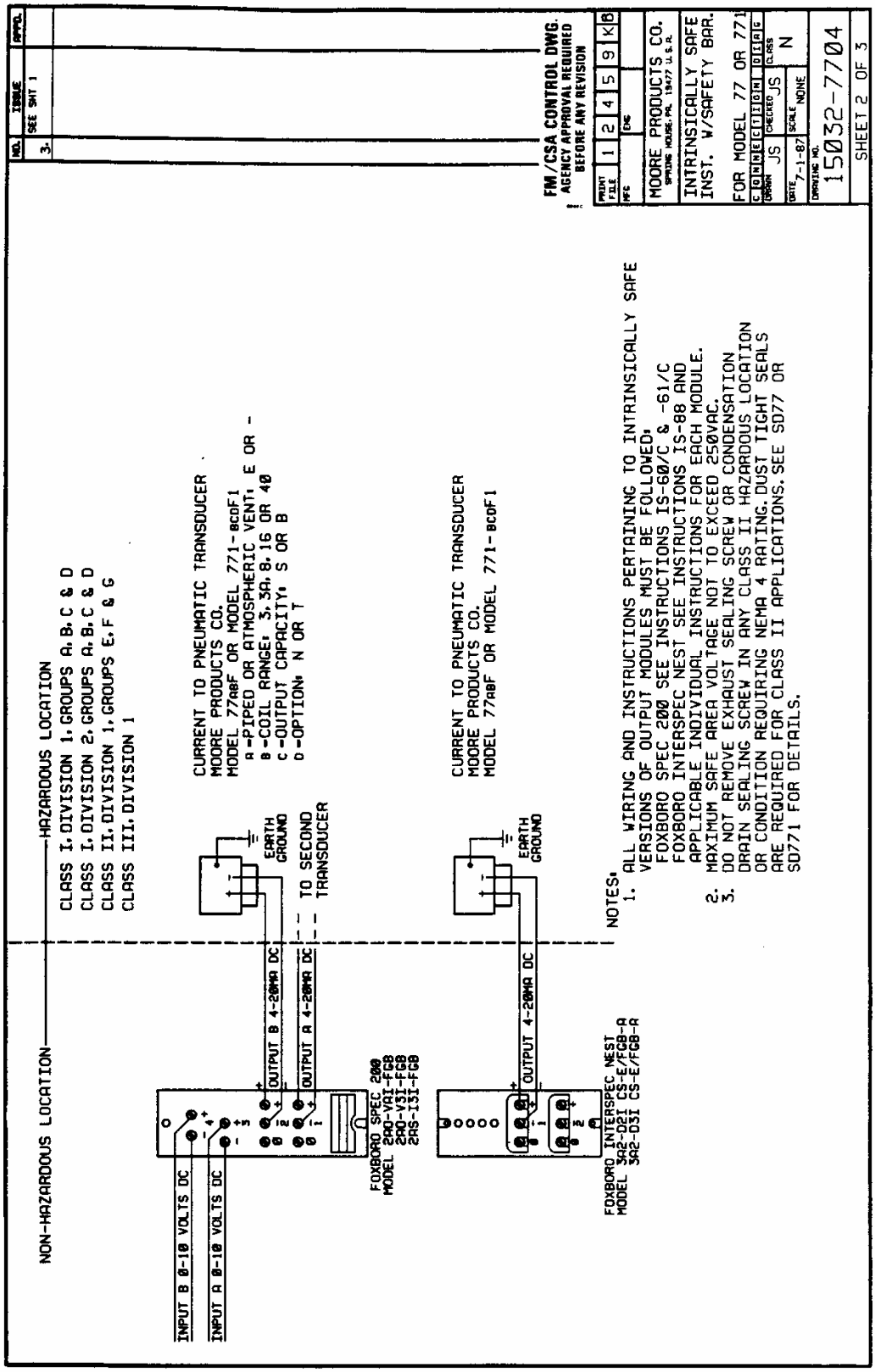
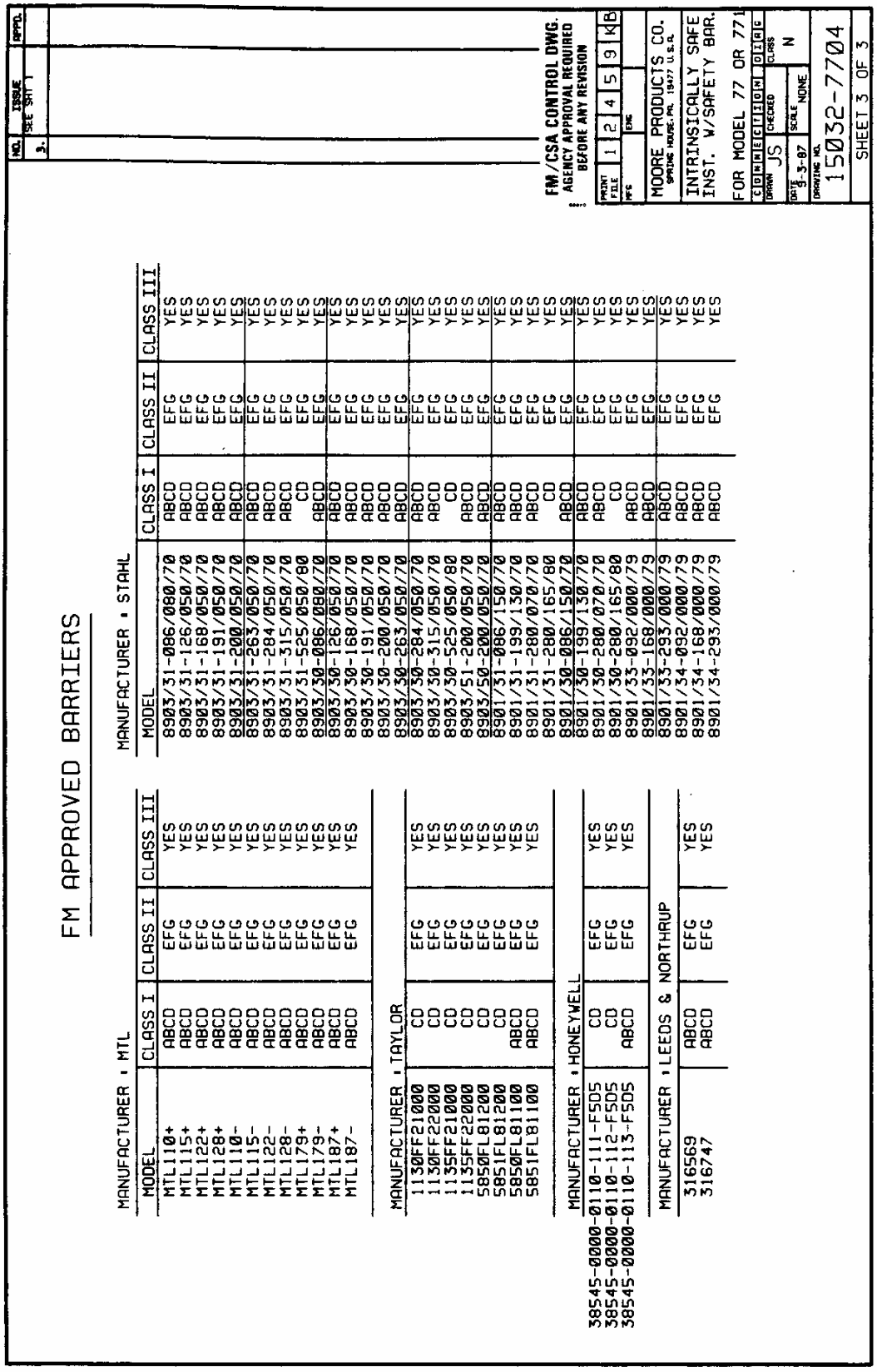

NON-HAZARDOUS LOCATION
HAZARDOUS LOCATION
CLASS I, DIVISION 1, GROUPS A, B, C & D
CLASS I, DIVISION 2, GROUPS A, B, C & D
CLASS II, DIVISION 1, GROUPS E, F & G
CLASS III, DIVISION 1
CURRENT TO PNEUMATIC TRANSDUCER
MOORE PRODUCTS CO.
MODEL 77aBF OR MODEL 771-BCDF1
a -PIPED OR ATMOSPHERIC VENT: E OR -
B -COIL RANGE: 3, 3A, 8, 16 OR 40
c -OUTPUT CAPACITY: S OR B
D -OPTION: N OR T
EARTH GROUND
TO SECOND TRANSDUCER
INPUT B 0-10 VOLTS DC
INPUT A 0-10 VOLTS DC
OUTPUT B 4-20MA DC
OUTPUT A 4-20MA DC
FOXBORO SPEC 200 MODEL 2A0-VAI-FGB 2A0-V3I-FGB 2AS-I3I-FGB
FOXBORO INTERSPEC NEST MODEL 3A2-D2I CS-E/FGB-A 3A2-D3I CS-E/FGB-A
CURRENT TO PNEUMATIC TRANSDUCER
MOORE PRODUCTS CO.
MODEL 77aBF OR MODEL 771-BCDF1
EARTH GROUND
OUTPUT 4-20MA DC
NOTES:
1. ALL WIRING AND INSTRUCTIONS PERTAINING TO INTRINSICALLY SAFE VERSIONS OF OUTPUT MODULES MUST BE FOLLOWED:
FOXBORO SPEC 200 SEE INSTRUCTIONS IS-60/C & -61/C
FOXBORO INTERSPEC NEST SEE INSTRUCTIONS IS-88 AND APPLICABLE INDIVIDUAL INSTRUCTIONS FOR EACH MODULE.
2. MAXIMUM SAFE AREA VOLTAGE NOT TO EXCEED 250VAC.
3. DO NOT REMOVE EXHAUST SEALING SCREW OR CONDENSATION DRAIN SEALING SCREW IN ANY CLASS II HAZARDOUS LOCATION OR CONDITION REQUIRING NEMA 4 RATING. DUST TIGHT SEALS ARE REQUIRED FOR CLASS II APPLICATIONS. SEE SD77 OR SD771 FOR DETAILS.
FM/CSA CONTROL DWG.
AGENCY APPROVAL REQUIRED BEFORE ANY REVISION
NO. ISSUE APPD.
3. SEE SHT 1
MOORE PRODUCTS CO.
SPRING HOUSE, PA. 19477 U.S.A.
INTRINSICALLY SAFE INST. W/SAFETY BAR.
FOR MODEL 77 OR 771
DRAWN JS CHECKED JS CLASS N
DATE 7-1-87 SCALE NONE
DRAWING NO. 15032-7704
SHEET 2 OF 3

FIGURE 8-2 Intrinsically Safe Installation, Model 77 or 771 & Foxboro Spec 200 or Interspec Nest



FM APPROVED BARRIERS

MANUFACTURER • MTL

MODEL	CLASS I	CLASS II	CLASS III
MTL110+	ABCD	EFG	YES
MTL115+	ABCD	EFG	YES
MTL122+	ABCD	EFG	YES
MTL128+	ABCD	EFG	YES
MTL110-	ABCD	EFG	YES
MTL115-	ABCD	EFG	YES
MTL122-	ABCD	EFG	YES
MTL128-	ABCD	EFG	YES
MTL179+	ABCD	EFG	YES
MTL179-	ABCD	EFG	YES
MTL187+	ABCD	EFG	YES
MTL187-	ABCD	EFG	YES

MANUFACTURER • TAYLOR

1130FF21000	CD	EFG	YES
1130FF22000	CD	EFG	YES
1135FF21000	CD	EFG	YES
1135FF22000	CD	EFG	YES
5850FL81200	CD	EFG	YES
5851FL81200	CD	EFG	YES
5850FL81100	ABCD	EFG	YES
5851FL81100	ABCD	EFG	YES

MANUFACTURER • HONEYWELL

38545-0000-0110-111-FSDS	CD	EFG	YES
38545-0000-0110-112-FSDS	CD	EFG	YES
38545-0000-0110-113-FSDS	ABCD	EFG	YES

MANUFACTURER • LEEDS & NORTHRUP

316569	ABCD	EFG	YES
316747	ABCD	EFG	YES

MANUFACTURER • STAHL

MODEL	CLASS I	CLASS II	CLASS III
8903/31-086/000/70	ABCD	EFG	YES
8903/31-126/050/70	ABCD	EFG	YES
8903/31-168/050/70	ABCD	EFG	YES
8903/31-191/050/70	ABCD	EFG	YES
8903/31-200/050/70	ABCD	EFG	YES
8903/31-263/050/70	ABCD	EFG	YES
8903/31-284/050/70	ABCD	EFG	YES
8903/31-315/050/70	ABCD	EFG	YES
8903/31-525/050/80	CD	EFG	YES
8903/30-086/000/70	ABCD	EFG	YES
8903/30-126/050/70	ABCD	EFG	YES
8903/30-168/050/70	ABCD	EFG	YES
8903/30-191/050/70	ABCD	EFG	YES
8903/30-200/050/70	ABCD	EFG	YES
8903/30-263/050/70	ABCD	EFG	YES
8903/30-284/050/70	ABCD	EFG	YES
8903/30-315/050/70	ABCD	EFG	YES
8903/30-525/050/80	CD	EFG	YES
8903/51-200/050/70	ABCD	EFG	YES
8903/50-200/050/70	ABCD	EFG	YES
8901/31-086/150/70	ABCD	EFG	YES
8901/31-199/130/70	ABCD	EFG	YES
8901/31-280/070/70	ABCD	EFG	YES
8901/31-280/165/80	CD	EFG	YES
8901/30-086/150/70	ABCD	EFG	YES
8901/30-199/130/70	ABCD	EFG	YES
8901/30-280/070/70	ABCD	EFG	YES
8901/30-280/165/80	CD	EFG	YES
8901/33-092/000/79	ABCD	EFG	YES
8901/33-168/000/79	ABCD	EFG	YES
8901/33-293/000/79	ABCD	EFG	YES
8901/34-092/000/79	ABCD	EFG	YES
8901/34-168/000/79	ABCD	EFG	YES
8901/34-293/000/79	ABCD	EFG	YES

FM/CSA CONTROL DWG.
AGENCY APPROVAL REQUIRED
BEFORE ANY REVISION

NO.	ISSUE	APPD.
3.	SEE SHT 1	

PRINT FILE 1 2 4 5 9 KB
MFG ENG

MOORE PRODUCTS CO.
SPRING HOUSE, PA. 19477 U.S.A.

INTRINSICALLY SAFE
INST. W/SAFETY BAR.

FOR MODEL 77 OR 771

DRAWN JS | CHECKED | CLASS | DIVISION 1 GROUP A B C D

DATE 9-3-97 | SCALE NONE | N

DRAWING NO. 15032-7704

SHEET 3 OF 3

FIGURE 8-3 Intrinsically Safe Installation, Approved Barriers

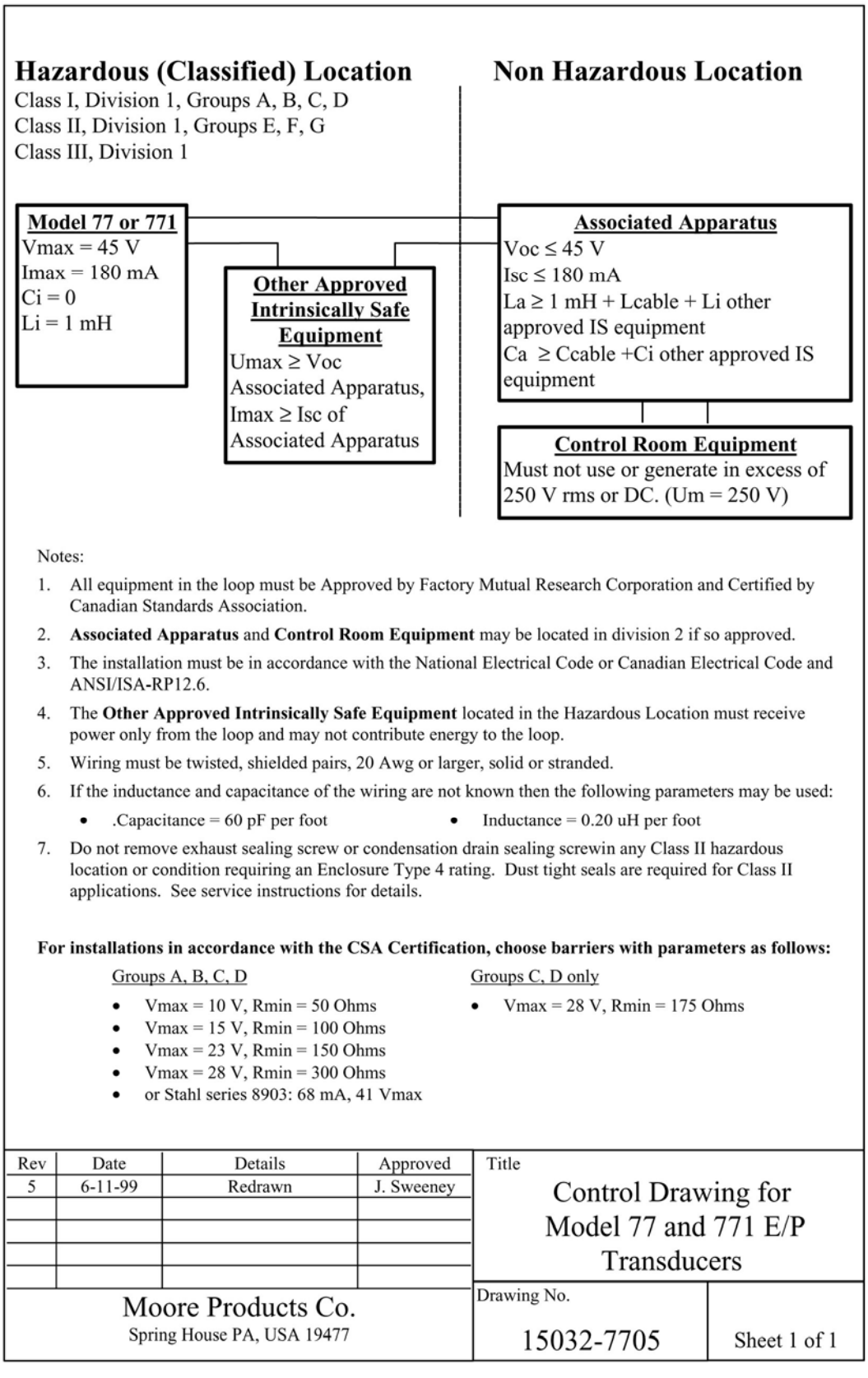

Hazardous (Classified) Location
Class I, Division 1, Groups A, B, C, D
Class II, Division 1, Groups E, F, G
Class III, Division 1
Non Hazardous Location
Model 77 or 771
Vmax = 45 V
Imax = 180 mA
Ci = 0
Li = 1 mH
Other Approved Intrinsically Safe Equipment
Umax ≥ Voc Associated Apparatus, Imax ≥ Isc of Associated Apparatus
Associated Apparatus
Voc ≤ 45 V
Isc ≤ 180 mA
La ≥ 1 mH + Lcable + Li other approved IS equipment
Ca ≥ Ccable +Ci other approved IS equipment
Control Room Equipment
Must not use or generate in excess of 250 V rms or DC. (Um = 250 V)
Notes:
1. All equipment in the loop must be Approved by Factory Mutual Research Corporation and Certified by Canadian Standards Association.
2. Associated Apparatus and Control Room Equipment may be located in division 2 if so approved.
3. The installation must be in accordance with the National Electrical Code or Canadian Electrical Code and ANSI/ISA-RP12.6.
4. The Other Approved Intrinsically Safe Equipment located in the Hazardous Location must receive power only from the loop and may not contribute energy to the loop.
5. Wiring must be twisted, shielded pairs, 20 Awg or larger, solid or stranded.
6. If the inductance and capacitance of the wiring are not known then the following parameters may be used:
• .Capacitance = 60 pF per foot
• Inductance = 0.20 uH per foot
7. Do not remove exhaust sealing screw or condensation drain sealing screwin any Class II hazardous location or condition requiring an Enclosure Type 4 rating. Dust tight seals are required for Class II applications. See service instructions for details.
For installations in accordance with the CSA Certification, choose barriers with parameters as follows:
Groups A, B, C, D
• Vmax = 10 V, Rmin = 50 Ohms
• Vmax = 15 V, Rmin = 100 Ohms
• Vmax = 23 V, Rmin = 150 Ohms
• Vmax = 28 V, Rmin = 300 Ohms
• or Stahl series 8903: 68 mA, 41 Vmax
Groups C, D only
• Vmax = 28 V, Rmin = 175 Ohms
Rev
Date
Details
Approved
5
6-11-99
Redrawn
J. Sweeney
Title
Control Drawing for Model 77 and 771 E/P Transducers
Moore Products Co.
Spring House PA, USA 19477
Drawing No.
15032-7705
Sheet 1 of 1

FIGURE 8-4 Intrinsically Safe Connection Diagram, Model 77 and 771, Entity Parameters